2. Alignment and Adjustments

2-1 VCR Adjustment

2-1-1 Reference

1) X-Point (Tracking center) adjustment, “Head switching adjustment” and “NVRAM option setting” can be adjusted with remote control.
2) When replacing the VCR Main PCB Micom (IC601) and NVRAM (IC605 ; EEPROM) be sure to adjust the “Head switching adjustment” and “NVRAM option setting”.
3) When replacing the cylinder ass’y, be sure to adjust the “X-Point” and “Head switching adjustment”.
4) How to adjust.
   - Short the “TEST” Point Function-Timer PCB to set the adjustment mode.
   - If the corresponding adjustment button is pressed, the adjustment is performed automatically.

2-1-1(a) Location of adjustment button of remote control

☞ X-Point (Tracking Center) Adjustment ; ⓪ + ⑤

☞ NVRAM Option Setting ; ① + ④

☞ Head Switching Adjustment ; ① + ⓪

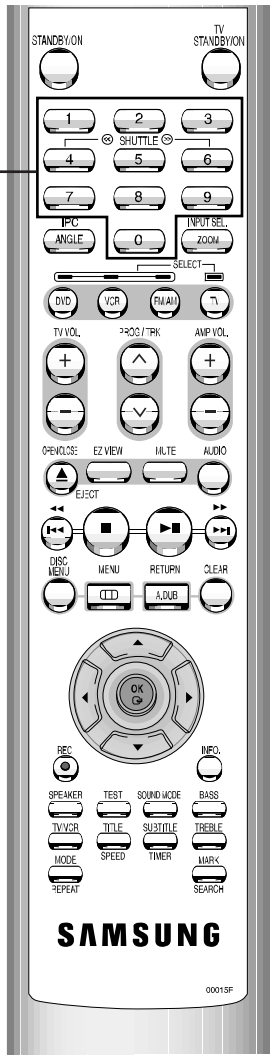


Fig. 2-1

2-1-1(b) TEST location for adjustment mode setting

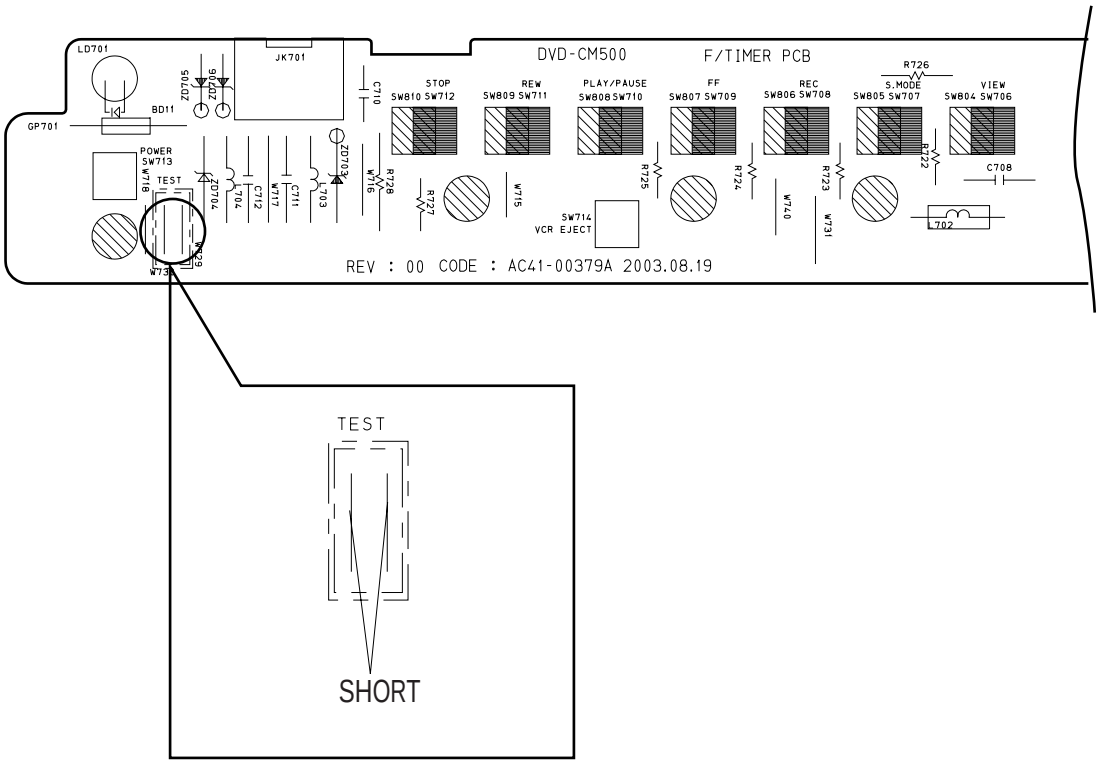


Fig. 2-2 Function-Timer PCB (Top View)

2-1-2 Head Switching Point Adjustment

1) Playback the alignment tape.
2) Short the “TEST’ point Function-Timer PCB to set the adjustment mode. (See Fig. 2-2)
3) Press the “1, 0” button; remote control adjustment operates automatically. (See Fig. 2-1)

2-1-3 NVRAM Option Setting

1) NVRAM Option is adjusted in the factory.
2) In case VCR Main PCB Micom (IC601) and NVRAM (IC605 ; EEPROM) are replaced, be sure to set the corresponding option number of the required model. (If the option is not set, the unit will not operate.)

1) Short the “TEST’ point Function-Timer PCB to set the adjustment mode. (See Fig. 2-2)
2) Press the “1, 4” buttons on the remote control. The option setting appears. (See Fig. 2-3)
3) Select the option number (See table 2-1) of corresponding model with “◀, ▶, ▲, ▼” buttons on the remote control.
4) After selecting the option number is completed, press the “▲” button of remote control.
(If “▲” button is pressed, the selected number is changescolor. ; See Fig. 2-4)
5) Press the “ENTER” button of remote control again to store the option number.
6) Turn the Power off.

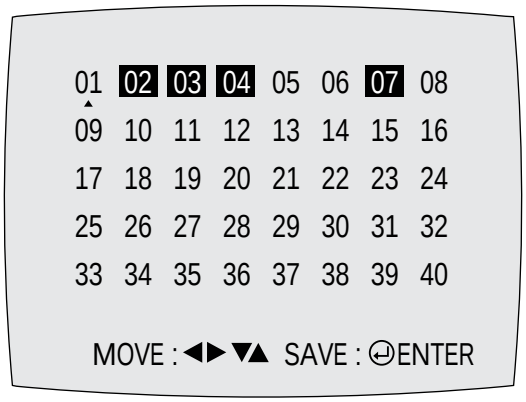


Fig. 2-3

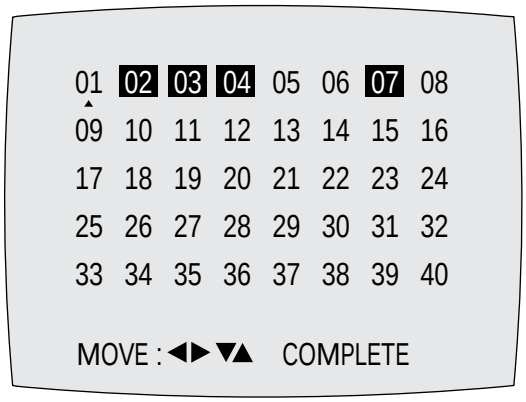


Fig. 2-4

<Table 2-1 NVRAM Option Table>

MODELS	OPTION NUMBERS
DVD-CM500/XEF	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 21, 23, 26, 29, 30, 32, 33, 34, 35, 36, 38, 40, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEU	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 27, 29, 30, 32, 34, 38, 40, 41, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEG	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XET	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEC	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/SED	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 21, 23, 26, 29, 30, 32, 33, 34, 35, 36, 38, 40, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEV	2, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 21, 23, 29, 30, 32, 33, 34, 36, 37, 39, 42, 46, 47, 54, 63, 65, 66, 69, 70
DVD-CM500/XEL	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEP	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEE	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 29, 30, 32, 34, 36, 38, 40, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/EUR	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 23, 29, 30, 32, 33, 34, 36, 38, 42, 46, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEO	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 23, 29, 30, 32, 33, 34, 36, 38, 42, 46, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/FES	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 23, 29, 30, 32, 34, 36, 38, 42, 46, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/AFR	2, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 21, 23, 29, 30, 32, 34, 36, 38, 42, 47, 63, 65, 66, 69, 70
DVD-CM500/XEH	2, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 20, 23, 29, 30, 32, 33, 34, 36, 38, 42, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XEUI	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 17, 18, 23, 25, 26, 29, 30, 32, 34, 38, 40, 43, 47, 63, 65, 66, 69, 70, 72
DVD-CM500/XSA	1, 6, 7, 9, 10, 12, 15, 17, 18, 20, 23, 28, 29, 30, 32, 33, 34, 39, 42, 47, 57, 63, 65, 66, 70
DVD-CM500/RAD	1, 6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 23, 29, 30, 32, 34, 36, 39, 42, 47, 57, 63, 65, 66, 70
CHT-2020/HACO	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XSG	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/TAW	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/UMG	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/ELT	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/SAM	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XST	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XSS	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/SMR	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XSV	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XSH	1, 6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 25, 27, 29, 30, 32, 35, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XTL	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 39, 42, 47, 57, 63, 65, 66, 70
CHT-500/BPT	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 22, 23, 29, 30, 32, 34, 36, 37, 38, 42, 47, 57, 63, 65, 66, 70
CHT-500/XFA	6, 7, 8, 9, 10, 12, 15, 17, 18, 20, 23, 25, 27, 29, 30, 32, 35, 38, 41, 42, 47, 57, 63, 65, 66, 70

2-2 DVD Adjustment

2-2-1 Location of Test Point

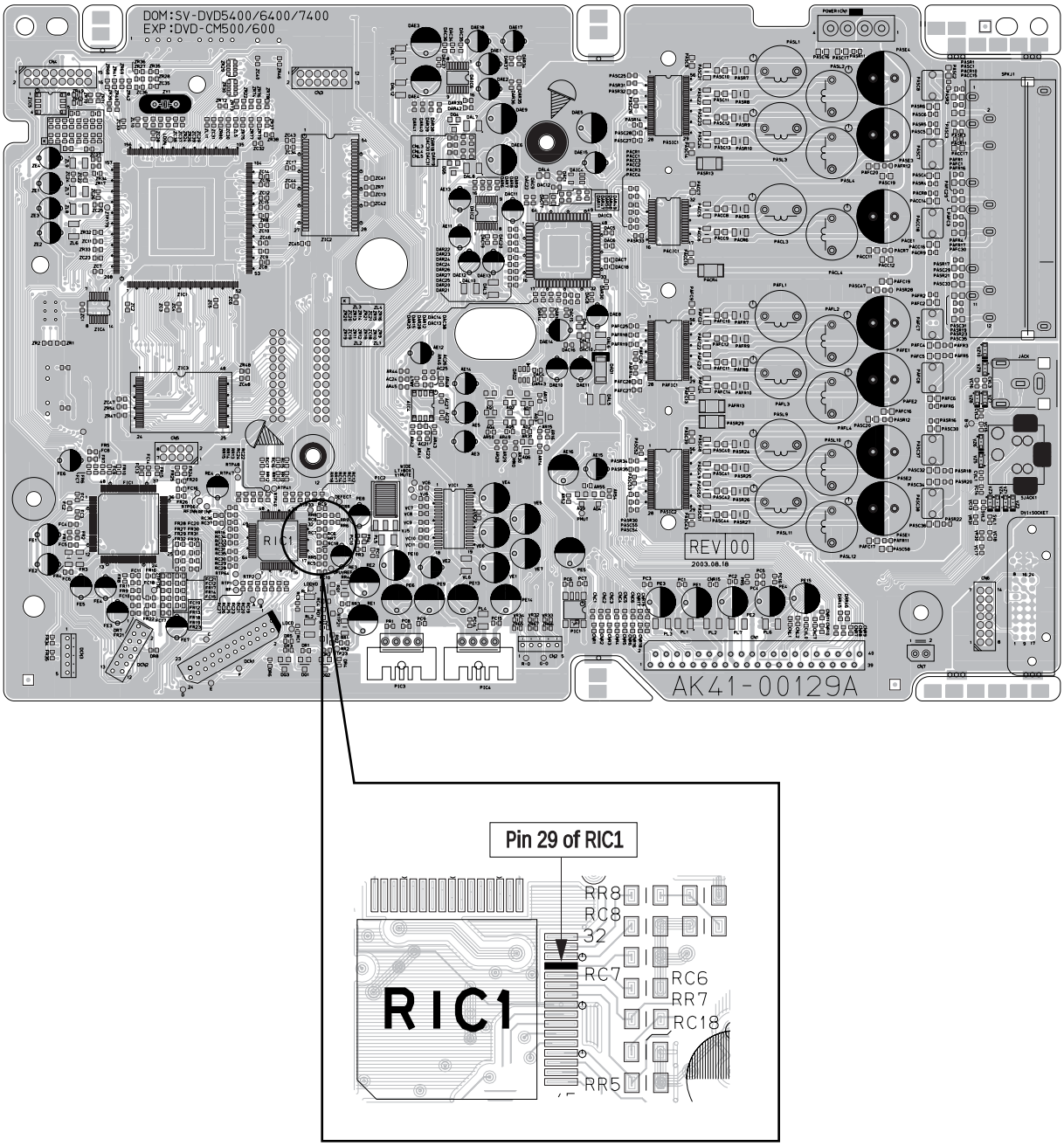


Fig. 2-5 Location of test Point (DVD Main PCB - Top Side)

2-2-2 Skew Adjustment

2-2-2(a) Adjustment Spec. and Test Point

<Table 2-2>

◆ Test Disc ; Service not Available

Test Disc	Adjustment Spec.	Test Point	Adjustment Location
TDV-533 Chapter 14	Flat Waveform	"Pin 29 of RIC1" (DVD Main PCB - Top Side) (See Fig. 2-5)	Ass'y Deck -Top Side (See Fig. 2-6)

◆ **SKEW (Tangential)** : The shift on the Vertical axis of Spindle Motor movement.

◆ **SKEW (Radial)** : The shift on the Direction of the Spindle Motor movement.

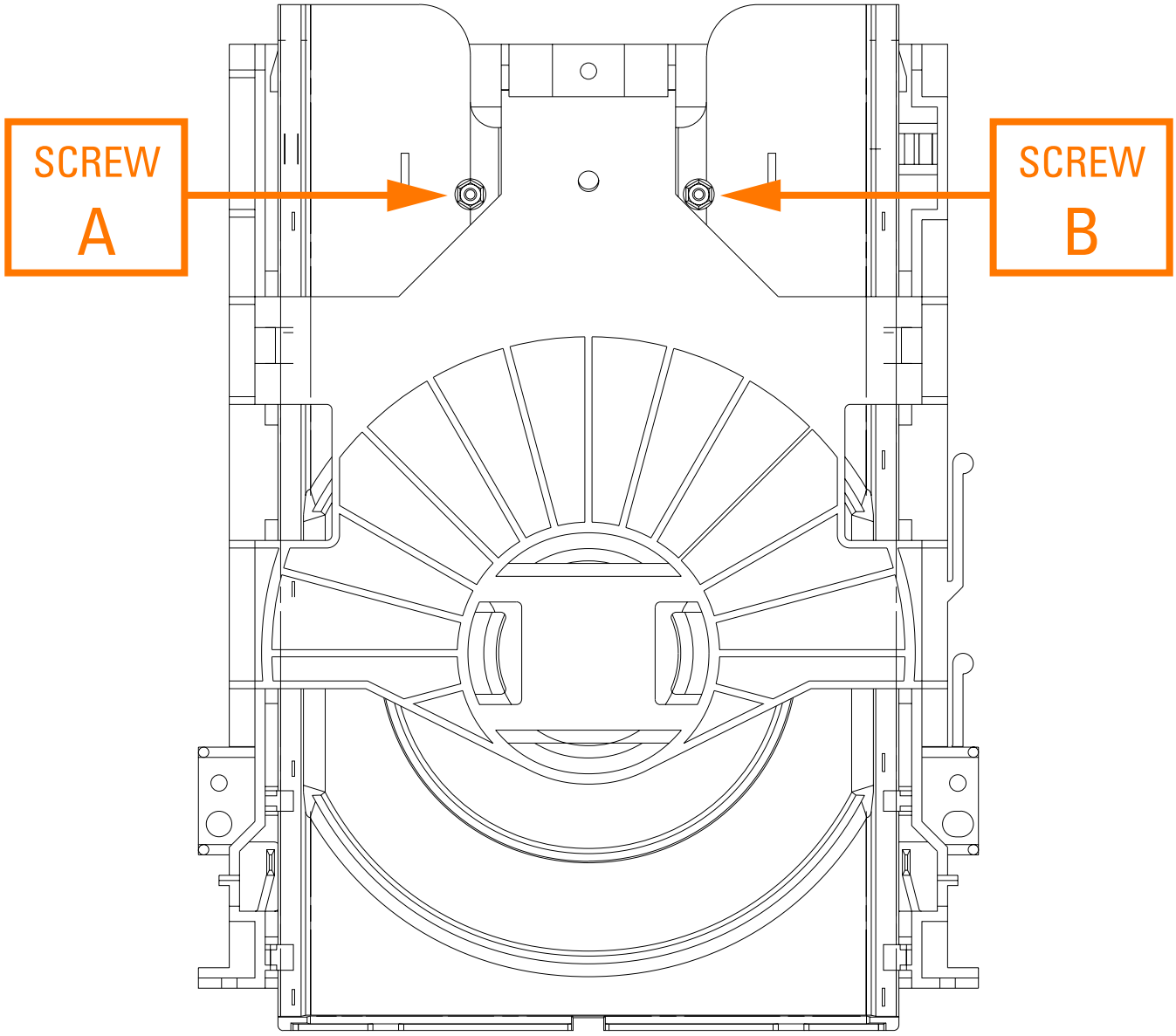


Fig. 2-6 Ass'y Deck (Top Side)

2-2-2(b) SKEW Adjustment Method

Needed to minimize the variations in Skew of the Pick-up unit and to provide optimum match with the recorded signal on the Disc.

1) Remove the Ass'y Deck.
   Place the Ass'y Deck on a flat horizontal position.
2) Connect an Oscilloscope to the "Pin 29 of RIC1" Test Point. (See Fig. 2-5)
   ◆ Set the Oscilloscope Range as follows :
   (Voltage ; 50mV / Div., Frequency ; 10m Sec.)
3) Connect Power, Open the Tray and Play Ch.14 which is in the TDV-533 Disc.
4) Adjust the Screws "A" and "B" (See Fig. 2-6) using a Hex screwdriver until you obtain a Flat Waveform and the picture is stable.
   Then, go to Chapter 1 and make sure the Waveform is Flat here as well.
   If not, you have to go back to Chapter 14 and adjust again.
   If you cannot obtain a Flat waveform, then the unit is defective.

Note : The Deck must be in a horizontal position. Use both "A" and "B" screws to adjust, but mostly "A".

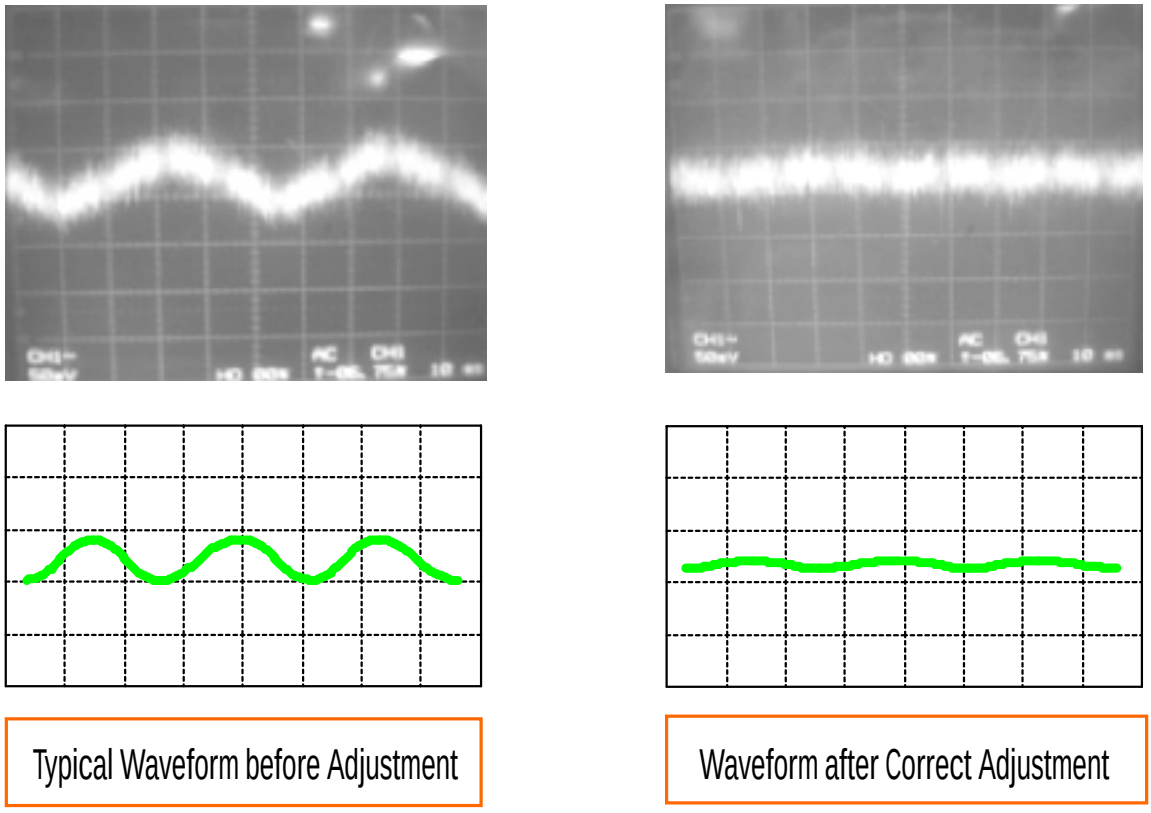


Fig. 2-7 Envelope Waveform

2-3 VCR Mechanical Adjustment

2-3-1 Tape Transport System and Adjustment Locations

The tape transport system has been adjusted precisely in the factory. Alignment is not necessary except for the following :
1) Noise observed on the screen.
2) Tape damage.
3) Parts replacement in the tape transport system.

Lower flange height of tape guide is used as the reference for the transport adjustment.
To maintain the height of the tape guide and prevent damage, do not apply excessive force onto the main base.

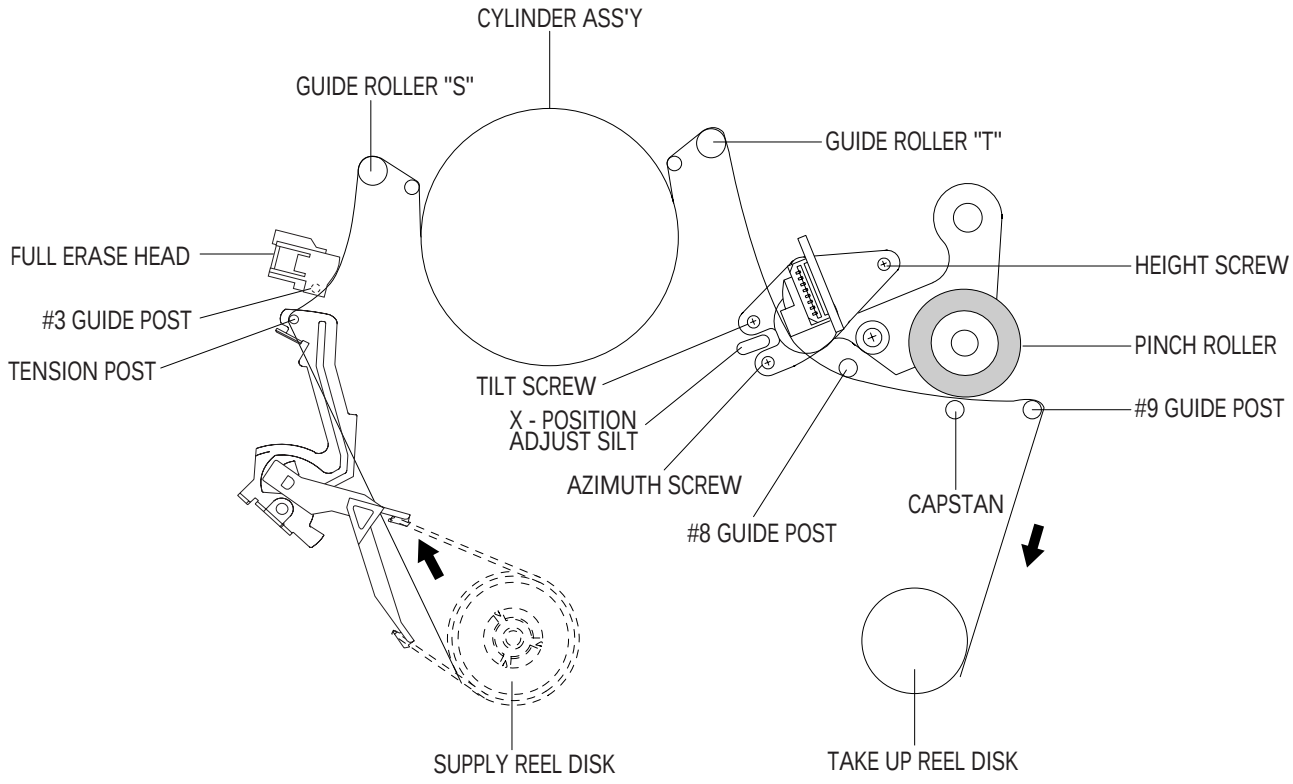


Fig. 2-8 Location of Tape Transport Adjustment

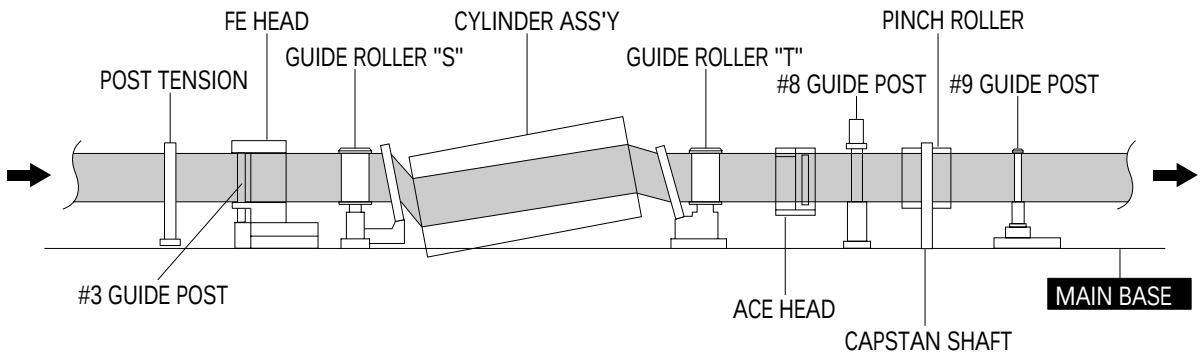


Fig. 2-9 Tape Travel Diagram

2-3-2 Tape Transport System Adjustment

When parts are replaced, perform the required adjustments by referring to procedures for the tape transport system. If there are any changes to the tape path, first run a T-120 tape and make sure excessive tape wrinkle does not occur at the tape guides.

◆ If tape wrinkle is observed at the guide roller S, T, turn the guide roller S, T until wrinkle disappears.
◆ If the tape wrinkle is still observed at the tape guide, perform the tilt adjustment of the ACE head.

(1) ACE Head Assembly Adjustment

a. ACE HEAD HEIGHT ADJUSTMENT

1) Run the alignment tape (Color bar) in the playback mode.
2) Observe surface of the audio head using a dental mirror.
3) Turn screw (C) clockwise or counterclockwise until the gap of lower tape edge and the lower edge of the control head is about 0.25mm. (Refer to Fig. 2-10 and 2-11)

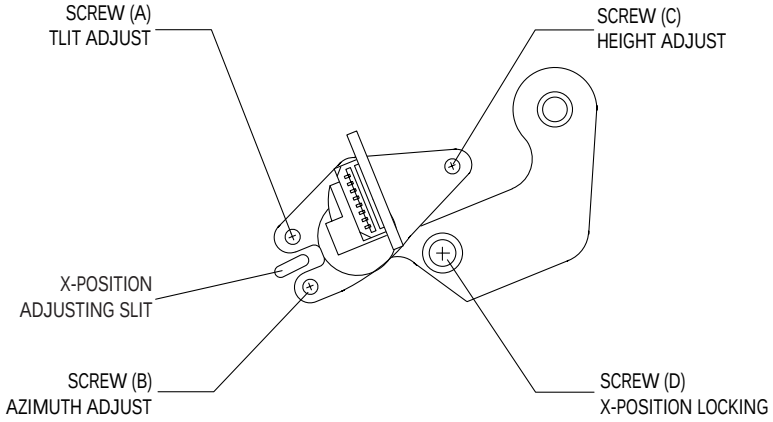


Fig. 2-10 Location of ACE Head Adjustment Screw

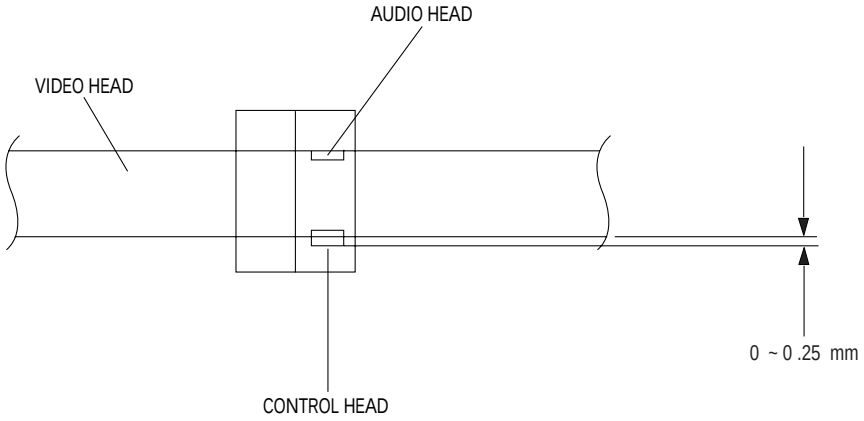


Fig. 2-11 ACE Head Height Adjustment

b. ACE HEAD TILT ADJUSTMENT

1) Playback a blank tape and observe the position of the tape at the lower flange of tape guide.
2) Confirm that there is no curl or wrinkle at the lower flange of tape guide as shown in Fig. 2-12 (B).
3) If a curl or wrinkle of the tape occurs, slightly turn the screw (A) tilt adjust on the ACE head ass'y.
4) Reconfirm the ACE head height.

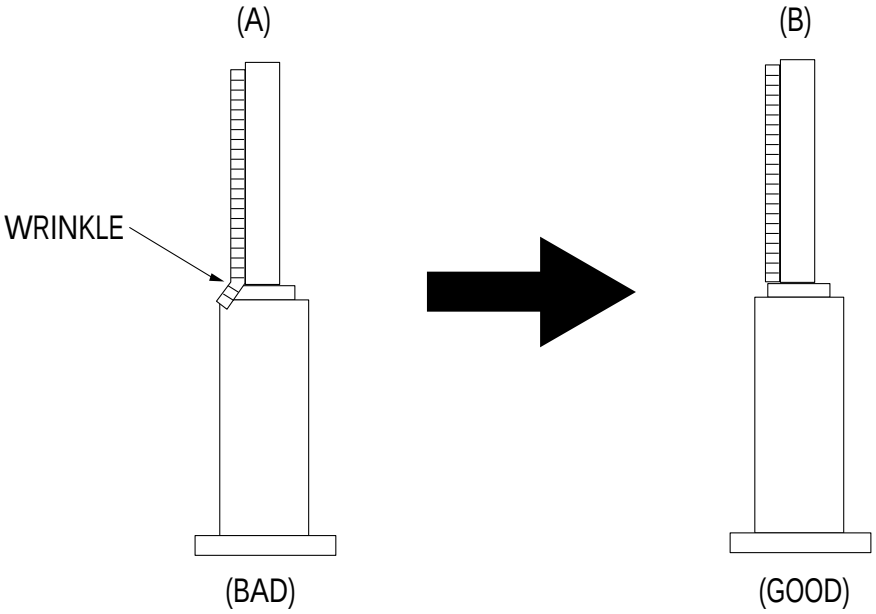


Fig. 2-12 Tape Guide Check

c. AUDIO AZIMUTH ADJUSTMENT

1) Load alignment tape (Mono scope) and playback the 7KHz signal.
2) Connect channel-1 scope probe to audio output.
3) Adjust screw (B) to achieve maximum audio level. (See Fig. 2-10)

d. ACE HEAD POSITION (X-POINT) ADJUSTMENT

1) Playback the alignment tape (Color bar).
2) Short the “TEST’ point Function-Timer PCB to set the adjustment mode. (See Fig. 2-2)
3) Press the “0, 5” remote control buttons, then adjustment is operates automatically. (See Fig. 2-1)
4) Connect the CH-1 probe to “Envelope” the CH-2 probe to “H’D switching pulse” and then trigger to CH-1.
5) Insert the (-) driver into the X-Point adjustment hole and adjust it so that envelope waveform is maximum.

Test point :	TP2 (Audio Output)
	TP3 (Envelope)
	TP4 (H’D S/W -Trigger)
	TP5 (Control Pulse)

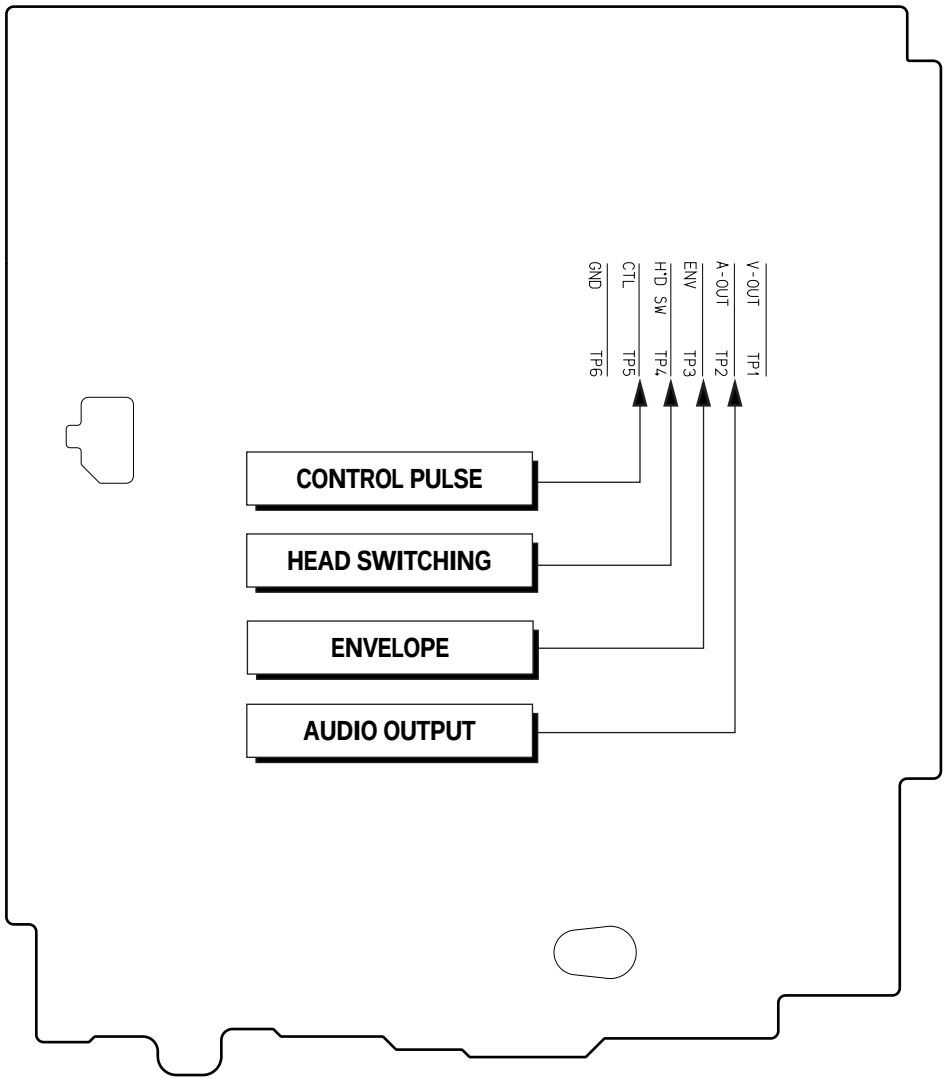


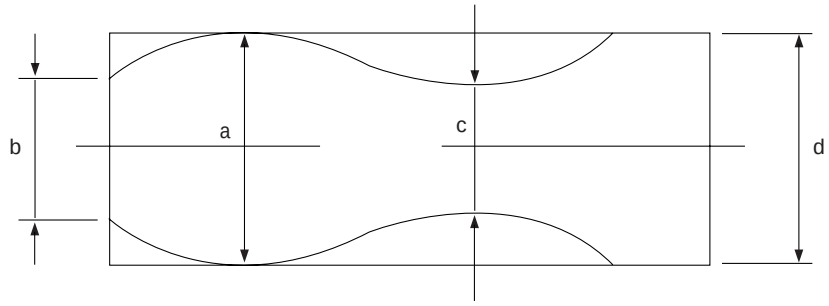
Fig. 2-13 Location of Test point (VCR Main PCB-Top View)

(2) Linearity adjustment (Guide roller S, T adjustment)

1) Playback the Mono Scope alignment tape (SP mode).
2) Observe the video envelope signal on an oscilloscope (triggered by the video switching pulse).
3) Make sure the video envelope waveform (at its minimum) meets the specification shown in Fig. 2-14.
   If it does not, adjust as follows :

Note :
a=Maximum output of the video RF envelope.
b=Minimum output of the video RF envelope at the entrance side.
c=Minimum output of the video RF envelope at the center point.
d=Maximum output of the video RF envelope at the exit side.

4) If the section A in Fig. 2-15 does not meet the specification, adjust the guide roller S up or down.
5) If the section B in Fig. 2-15 does not meet the specification, adjust the guide roller T up or down.



a b c d

c,b,d/a ≧ 63%

Fig. 2-14 Envelope Waveform Adjustment

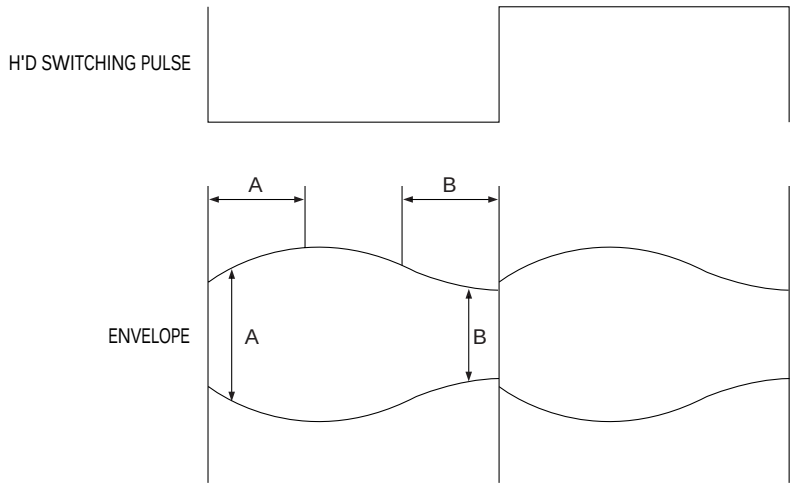


Fig. 2-15 Adjustment Points

6) Play back the Mono Scope alignment tape (SP mode).
7) Connect an oscilloscope CH-1 to the “Envelope” and CH-2 to the “H’D SW Pulse” for triggering.
8) Turn the guide roller heads with a flat head ( ) driver to obtain a flat video RF envelope as shown in Fig. 2-16.

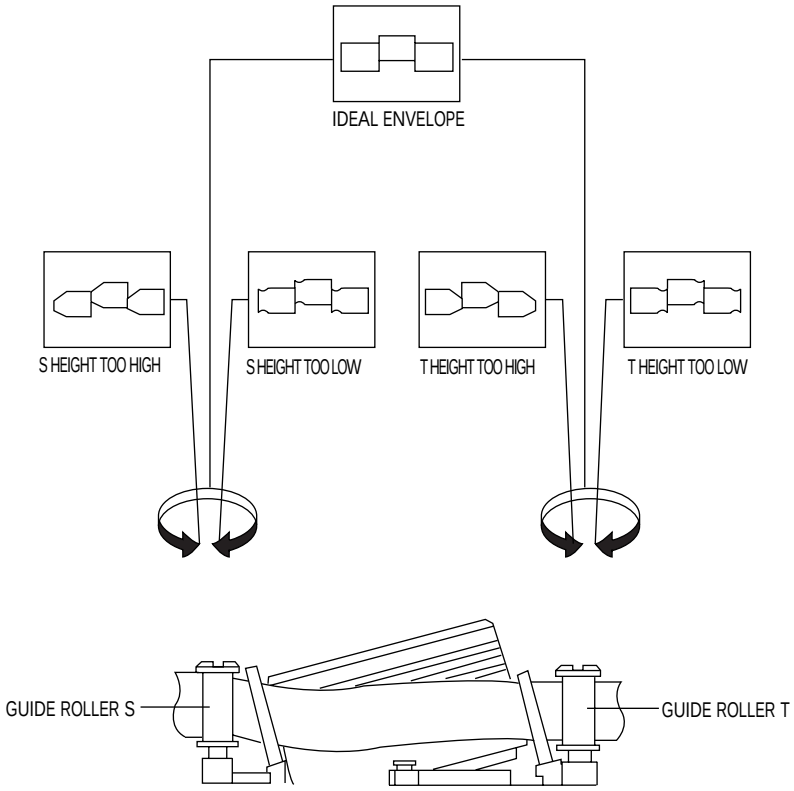


Fig. 2-16 Guide Roller S, T Height Adjustment

(3) Check Transitional Operation from RPS to Play

Check transition from RPS mode to play mode : Using a pre-recorded SP tape, make sure the entry side of envelope comes to an appropriate steady state within 3 seconds (as shown in Fig. 2-17).
If the envelope waveform does not reach specified peak-to peak amplitude within 3 seconds, adjust as follows :

1) Make sure there is no gap between the supply roller lower flange and the tape.
   If there is a gap, adjust the supply guide roller again.
2) Change operation mode from the RPS to the play mode (again) and make sure the entry side of envelope rises within 3 seconds.

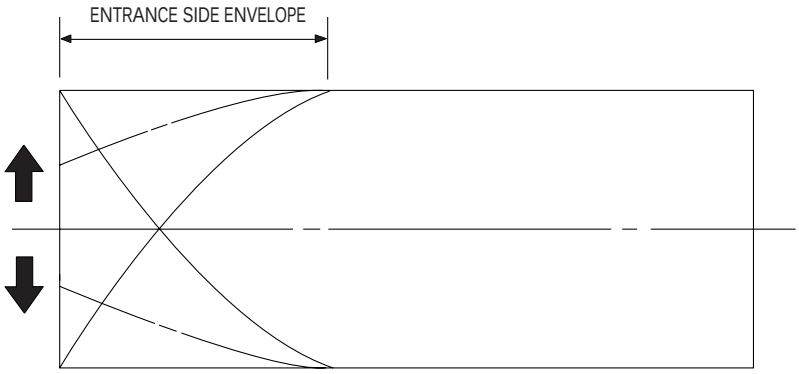


Fig. 2-17 Video Envelope Rising when Operation mode Changes from RPS to Play Mode

(4) Envelope Check

1) Make recordings on T-120 (E-120) and T-160 (E-180) tape.
   Make sure the playback output envelope meets the specification as shown in Fig. 2-18.
2) Play back a self recorded tape (recording made on the unit using with T-120 (E-120).
   The video envelope should meet the specification as shown in Fig. 2-18.
   In SP mode, (A) should equal (B).
   If the head gap is wide, upper cylinder should be checked.

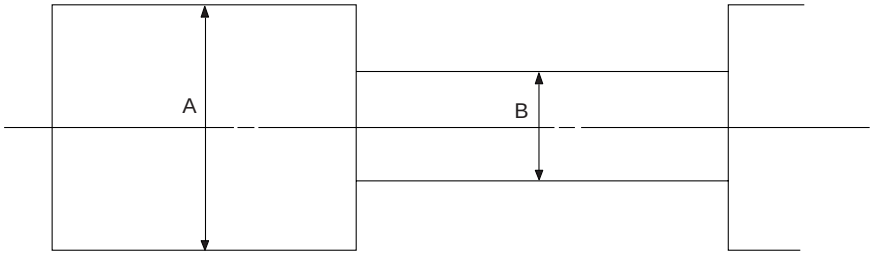


Fig. 2-18 Envelope Input and Output Level

(5) Tape Wrinkle Check

1) Run the T-160 (E-180) tape in the playback, FPS, RPS and Pause modes and observe tape wrinkle at each guide.
2) If excessive tape wrinkle is observed, perform the following adjustments in Playback mode :

- ◆ Tape wrinkle at the guide roller S, T section : Linearity adjustment.
- ◆ Tape wrinkle at tape guide flange : ACE head assembly coarse adjustment.

2-3-3 Reel Torque

1) The rotation of the capstan motor causes the holder clutch ass'y to rotate through the belt pulley.
2) The spring wrap PLAY/REV of holder clutch ass'y drives the disk reel S, T through gear idler by rotation of gear center ass'y.
3) Brake is operated by slider cam at FF/REW mode.
4) Transportation of accurate driving force is done by gears. (Gear Center Ass'y)

Note : If the spec. does not meet the followings specifications, replace the holder clutch ass'y and then recheck.

<Table 2-3>

MODE	TORQUE g/cm	GAUGE
PB	42 ± 11	Cassette Torquemeter
RPS	145 ± 30	Cassette Torquemeter

MEMO